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THE EFFECTS OF JUNIOR KINDERGARTEN ON ACHIEVEMENT--THE FIRST FIVE YEARS.

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IN 1960 AT TORONTO, CANADA, A LONGITUDINAL STUDY OF ACHIEVEMENT WAS BEGUN IN JUNIOR KINDERGARTEN WITH 8,695 CHILDREN. THE OBJECTIVES OF THE STUDY WERE (1) TO EVALUATE THE EFFECT OF JUNIOR KINDERGARTEN ATTENDANCE ON THE ACHIEVEMENT AND DEVELOPMENT OF CHILDREN, AND (2) TO EXAMINE THE NATURE OF THE WORLD OF JUNIOR AND SENIOR KINDERGARTEN CHILDREN. THE DATA COLLECTED CONSISTED OF INFORMATION AND SCORES FROM (1) THE DRAW-A-CLASSROOM TEST, (2) THE PUPIL PROFILE FOLDER, (3) THE RATING QUESTIONNAIRE, (4) THE METROPOLITAN ACHIEVEMENT TEST, AND (5) THE OTIS QUICK-SCORING MENTAL ABILITY TEST. FOUR TABLES WERE MADE TO COMPARE JUNIOR KINDERGARTEN CHILDREN WITH SENIOR KINDERGARTEN CHILDREN WHO HAD NOT ATTENDED JUNIOR KINDERGARTEN. OF THOSE WHO DID NOT GO TO JUNIOR KINDERGARTEN, MATCH 1 INCLUDES CHILDREN WHOSE PARENTS CHOSE NOT TO SEND THEM TO JUNIOR KINDERGARTEN. MATCH 2 INCLUDES CHILDREN LIVING WHERE JUNIOR KINDERGARTEN WAS NOT AVAILABLE. STATISTICALLY, MATCH 1 SHOWED JUNIOR KINDERGARTEN TO BE A GREAT ADVANTAGE. MATCH 2 SHOWED LITTLE DIFFERENCE, AND IN SOME CASES THE JUNIOR KINDERGARTEN GROUP WAS ACTUALLY SURPASSED BY THE SENIOR KINDERGARTEN GROUP. A POSSIBLE EXPLANATION FOR THE INSIGNIFICANT DIFFERENCE SHOWN IN MATCH 2 IS THAT PARENTS OF THOSE SENIOR KINDERGARTEN CHILDREN HAD JUST ENOUGH SCHOOLING TO PLACE A HIGH VALUE ON EDUCATION. THE EFFECTS OF JUNIOR KINDERGARTEN DISAPPEAR IN ABOUT 4 YEARS. IF JUNIOR KINDERGARTEN IS TO HAVE A LASTING EFFECT, THEN THE ENTIRE SCHOOL PROGRAM SHOULD BUILD ON THIS EXPERIENCE. THE APPENDIX TO THIS DOCUMENT IS PS 000 358. (CO)

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The Effects of Junior Kindergarten on Achievement: the first five years

Judith Palmer

1966

PS000357

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THE EFFECTS OF JUNIOR KINDERGARTEN ON ACHIEVEMENT: The First Five Years

I - INTRODUCTION

In the fourth century B. C. Plato advocated state care and education for children from birth to adulthood. For three to six-year-olds he recommended games as a healthful pastime for young minds and bodies. Over twenty centuries later educators discussed the merits of sending a child to kindergarten and came to the conclusion that: "The results indicate that the kindergarteners did decidedly better than the non-kindergarteners in the first grade both as to progress in subject matter and the ability to adjust themselves to school conditions" (Myers, 1937). Also, "Children with kindergarten training were found to achieve significantly higher scores on all reading tests than children without such training" (Fast, I., 1957). The possibility of furthering educational opportunity to even younger children seemed remote following a random poll of school administrators in the United States in 1954. The idea of pre-kindergarten classes maintained by the local public school system was rejected by 67% of those polled (Nation's Schools, 1954). At the time such classes existed in only 7% of the school districts of the country.

In 1960, the Board of Education for the City of Toronto began research in its thirty-six junior kindergartens with two objectives: (1) evaluating the effect of junior kindergarten attendance upon the achievement and development of children and (2) examining the nature of the world of junior and senior kindergarten children. According to Bloom (1964), this course of action is desirable because variations in the environment have their greatest quantitative effect on a characteristic at its most rapid

period of change and the least effect on a characteristic during the least rapid period of change. He suggests that 17% of educational growth takes place between four and six years of age and therefore nursery school and kindergarten would have far-reaching consequences on the child's general learning pattern. The early grades of elementary school are also vital and he states with reference to this that: "We are inclined to believe that this is the most important growing period for academic achievement and that all subsequent learning in the school is affected and in large part determined by what the child has learned by the end of grade three." (p. 110)

"Pre-School Education - Pros and Cons" (Palmer, J., 1966) is a survey of the literature related to this study. The research results to date have been inconclusive partly because of the wide variability in the research designs and the different kinds of educational environments involved. Despite the lack of significant findings junior kindergartens have sprung up throughout the world and have in recent years found increasing governmental support in the United States and Canada.

Generally speaking it can be said that pre-school programmes were included in the local school system to facilitate "culturally deprived" youngsters. This was to be their introduction to middle class values as well as to the school system; however, in the report issued by the Toronto Board's Research Department entitled, "Study of Achievement: Junior Kindergarten: Who is Served and Who Goes," it was evident that:

"...the characteristics of the population actually enrolling their children in junior kindergarten closely paralleled the populations to whom junior kindergarten was <u>not</u> available, rather than the populations to whom it was available." (p. 17) That is, children from middle class English homes were more likely to be attending junior kindergarten than their counterparts from low socio-economic, non-English speaking homes. Thus, the analysis of the results of this study must take this fact into account.

It will become even more apparent at the conclusion of this report that a study should be mounted to investigate attitudes towards education of parents who send, or do not send their children to junior kindergarten. Before embarking on such a project, the researcher would have to identify those parents whose children were refused admission because of limited space. Children were, and are, admitted or rejected on the basis of age. Where public demand was sufficiently great, the programme was altered from five days to three days to admit more children. Only a small percentage of the children involved in this study were unable to attend because of limited accommodation in schools where a junior kindergarten programme existed.

II - PROCEDURE

A General Outline of the Experiment

The longitudinal Study of Achievement was begun in 1960 and included 1,486 children enrolled in junior kindergarten. The following year all pupils in senior kindergarten became part of the study which brought the number of children involved up to 8,695. The study included repeaters, accelerants, and those children in special classes.

Each year is designated by a new stage number. When the phrase Stage III (grade 1) is used the reader must understand that a few subjects were actually still in kindergarten and fewer were in grade 2. The data collected consisted of information and scores from the following:

1. Pupil Profile Folder completed by the kindergarten teachers;
2. Rating Questionnaire completed by teachers in senior kindergarten, grades 1, 2, and 3;
3. Draw-a-Classroom Test administered twice in junior kindergarten and senior kindergarten, and once in grades 1, 2, and 3;
4. Metropolitan Achievement Test administered in grades 1, 2, and 3;
5. Otis Quick-Scoring Mental Ability Tests (New Edition -- Alpha Short Form) administered in grade 2 (Stage IV).

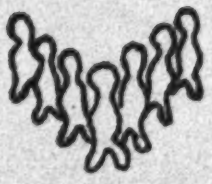
The background information was recorded on a Pupil Profile Folder and included the parents' educational and occupational status, countries of birth, and languages spoken. Other indices such as the position of the child in the family (youngest, eldest), the number of children in the family, and the number of adults living in the house were also recorded.

The Rating Questionnaire has been modified stage by stage on the basis of data analysis and teachers' comments. It was primarily designed as a method of getting at the diverse properties of the nebulous concept of "achievement."

The Draw-a-Classroom Test was envisaged as a unique instrument for judging the development of the child. The results of this "test" will be described in a separate report.

The Metropolitan Achievement Test and the Otis Quick-Scoring Mental Ability Tests (New Edition -- Alpha Short Form) provided relevant standardized "educational" indices.

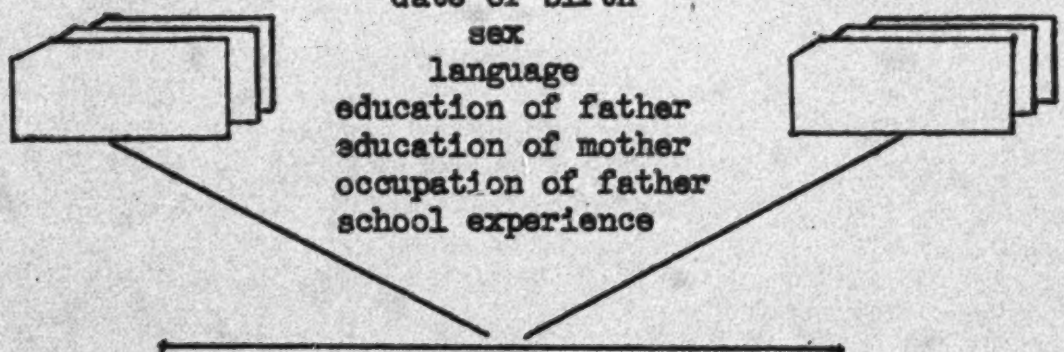
Before it was possible to compare the junior and senior kindergarten groups, special matching procedures had to be undertaken to control for a socio-economic bias in the junior kindergarten population (Toronto Board of Education, 1965). In addition, the selective feature in attendance (some children were in districts where junior kindergarten was not available) made necessary two matched sets: in Match #1, the senior kindergarten children could have gone to junior kindergarten but did not; in Match #2, the senior kindergarten children did not have junior kindergarten available to them. The factors on which the junior and senior kindergarten children were matched were identical for both matched sets. They included age, sex, language, education of father, education of mother, and occupation of father. This information was recorded on I. B. M. computer cards. At each stage of the matching procedure all the cards remaining from the last sort were processed on the new factor. The cards for which matches could not be found were omitted from further processing. At the conclusion of this procedure the computer identified a pair of students with certain characteristics in common, but only one of which attended junior kindergarten. (See Diagram 1.)



Children with Junior Kindergarten

Children without Junior Kindergarten

Student Information Coded on I.B.M. Cards



born: Feb. 1956
female
English
entered secondary school(mother)
entered secondary school(father)
skilled labour
JUNIOR KINDERGARTEN

born: Feb. 1956
female
English
entered secondary school(mother)
entered secondary school(father)
skilled labour
NO JUNIOR KINDERGARTEN

Diagram 1
THE COMPUTER CREATES ONE "MATCHED PAIR"

At the conclusion of the matching procedures Match #1 consisted of 608 matched pairs and Match #2 consisted of 661 matched pairs. Diagram 2 below shows the composition of the two matches.

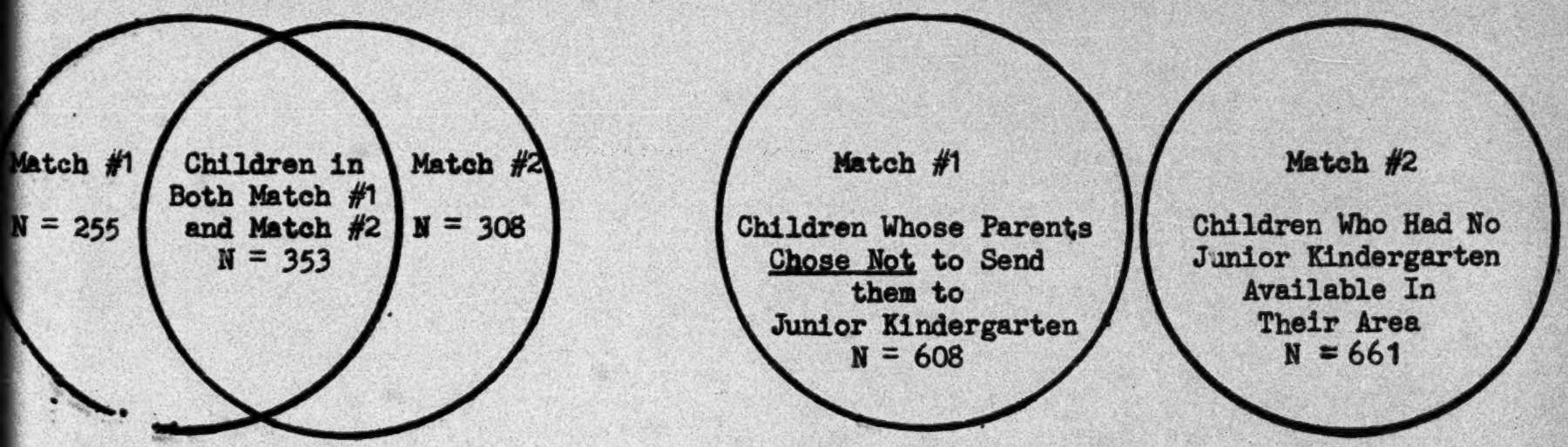

JUNIOR KINDERGARTEN
SENIOR KINDERGARTEN
Match #1
N = 255
Children in Both Match #1 and Match #2
N = 353
Match #2
N = 308
Match #1
Children Whose Parents Chose Not to Send them to Junior Kindergarten
N = 608
Match #2
Children Who Had No Junior Kindergarten Available In Their Area
N = 661

Diagram 2
COMPOSITION OF JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #1 AND MATCH #2

Statistical Procedures

Statistics provide the methodology whereby the experimental data in psychology, education, and related disciplines can be represented in a meaningful and compact form. Statistical procedures used in describing a characteristic of a sample or population are referred to as "descriptive statistics" e.g., the "mean" or average of students' Geography marks is a descriptive statistic. Statistics used in drawing inferences about the properties of populations from samples are known as "sampling" or

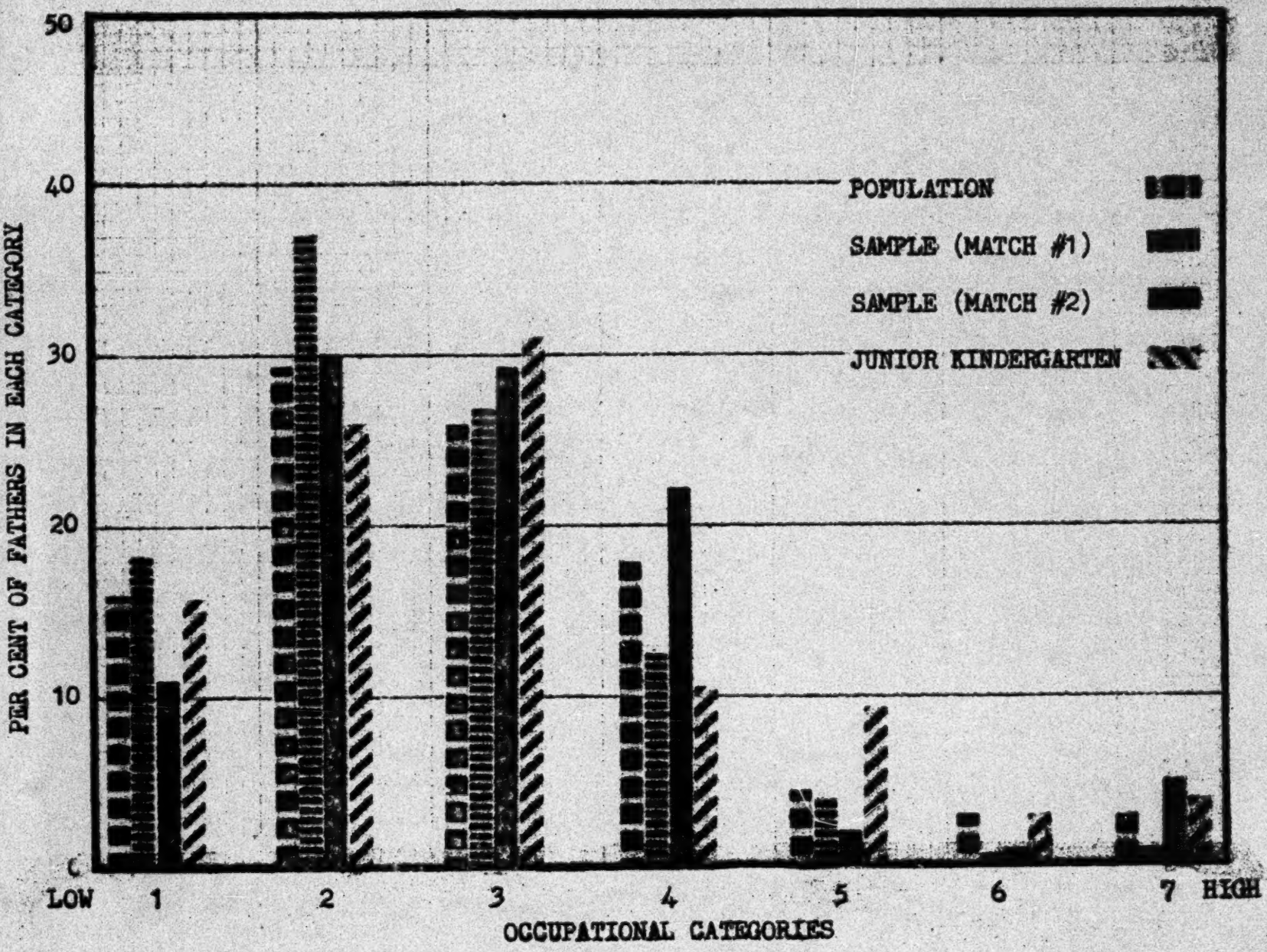
"inferential" statistics. These statistics provide information as to the accuracy of inferences which may be drawn, i.e., they indicate the probability of the hypothesis occurring by chance.

The statistical procedures used to analyze the data in this study are not complex. The problem was to determine whether any difference existed between junior and senior kindergarten groups. Because the groups differed on factors other than school experience which might affect their scores, they were matched, i.e., a junior kindergarten child was paired with a senior kindergarten child of the same age, sex, and socio-economic background. This matching procedure insured that the differences between the scores achieved by the two groups could not be attributed to these "background" characteristics. The "mean," is used to describe the central tendency of the scores in each group. It would be unlikely to have two identical means. However, the problem is to determine whether the differences between means are just a minor chance fluctuation or a larger difference which cannot be attributed to chance. The "t" test is a way of comparing the means of the two groups to see how different they are and if this difference is significant. Statistical significance is determined by comparing the "t" value to those in a table of values and in this way the degree of chance is determined, e.g., this result could have occurred by chance once in a hundred times. The "t" in this case would be said to be "significant at .01." When the "t's" are significant at .05 or .01 or less we then assume that there is a meaningful difference between the two groups being compared. If this resulted in the present study we would assume that there was a difference between junior and senior kindergarten groups. A positive "t" value would indicate that junior kindergarten children did better than their senior kindergarten counterparts, while a negative value would mean the reverse.

Statistically this would be termed a two-tailed "t" test because it allows for a difference in either a positive or negative direction.

The foregoing should be sufficient to allow interpretation of the "results" section.

If the results of this study are to be accepted as generally true for the entire Toronto kindergarten population then it must be shown that the samples (Match #1 and Match #2) are representative of that population. The four graphs which follow provide descriptions of the junior and senior kindergarten populations, Match #1, and Match #2.



GRAPH 1 (a)

PER CENT OF CHILDREN WHOSE FATHERS FALL
INTO EACH OCCUPATIONAL CATEGORY

Code to Occupational Categories

1 - unskilled employees

2 - semi-skilled employees

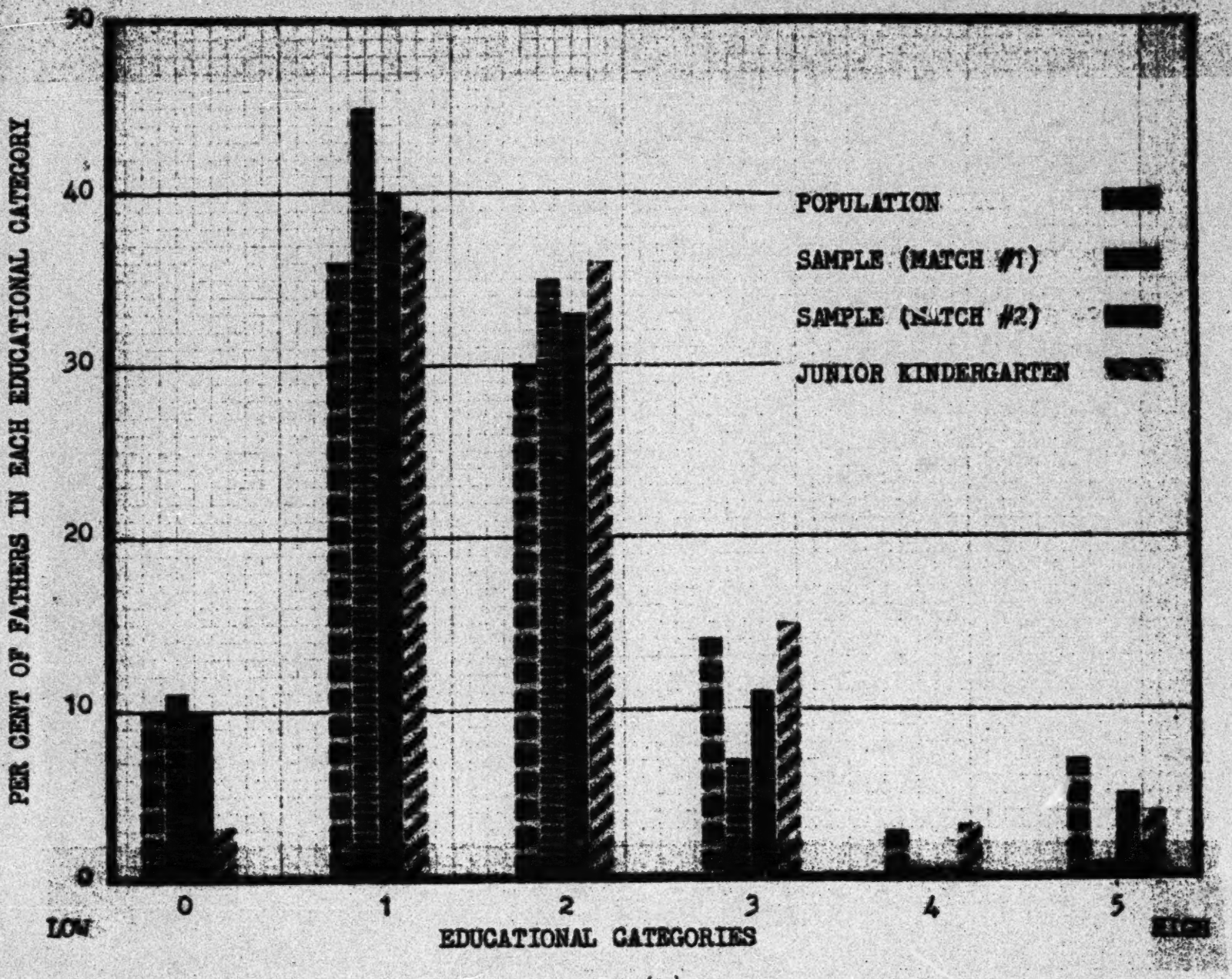
3 - skilled manual

4 - clerical and sales

5 - administrative personnel

6 - business managers

7 - higher executives and professionals



GRAPH 1 (b)

PER CENT OF CHILDREN WHOSE FATHERS FALL INTO EACH EDUCATIONAL CATEGORY

Code to Educational Categories

0 - did not complete public school

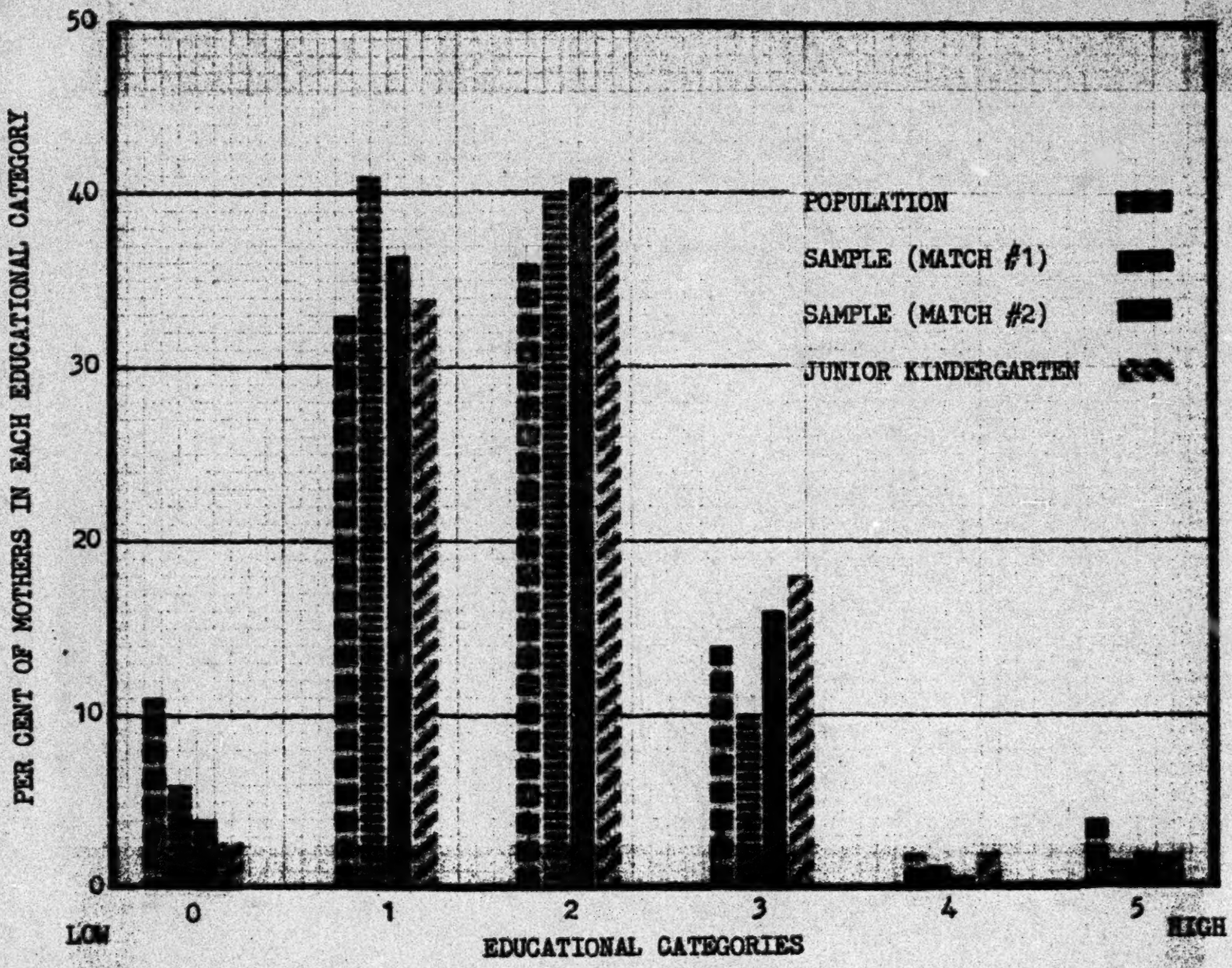
1 - completed public school

2 - did not complete secondary school

3 - completed secondary school

4 - did not complete university

5 - completed university



GRAPH 1 (c)

PER CENT OF CHILDREN WHOSE MOTHERS FALL INTO EACH EDUCATIONAL CATEGORY

Code to Educational Categories

0 - did not complete public school

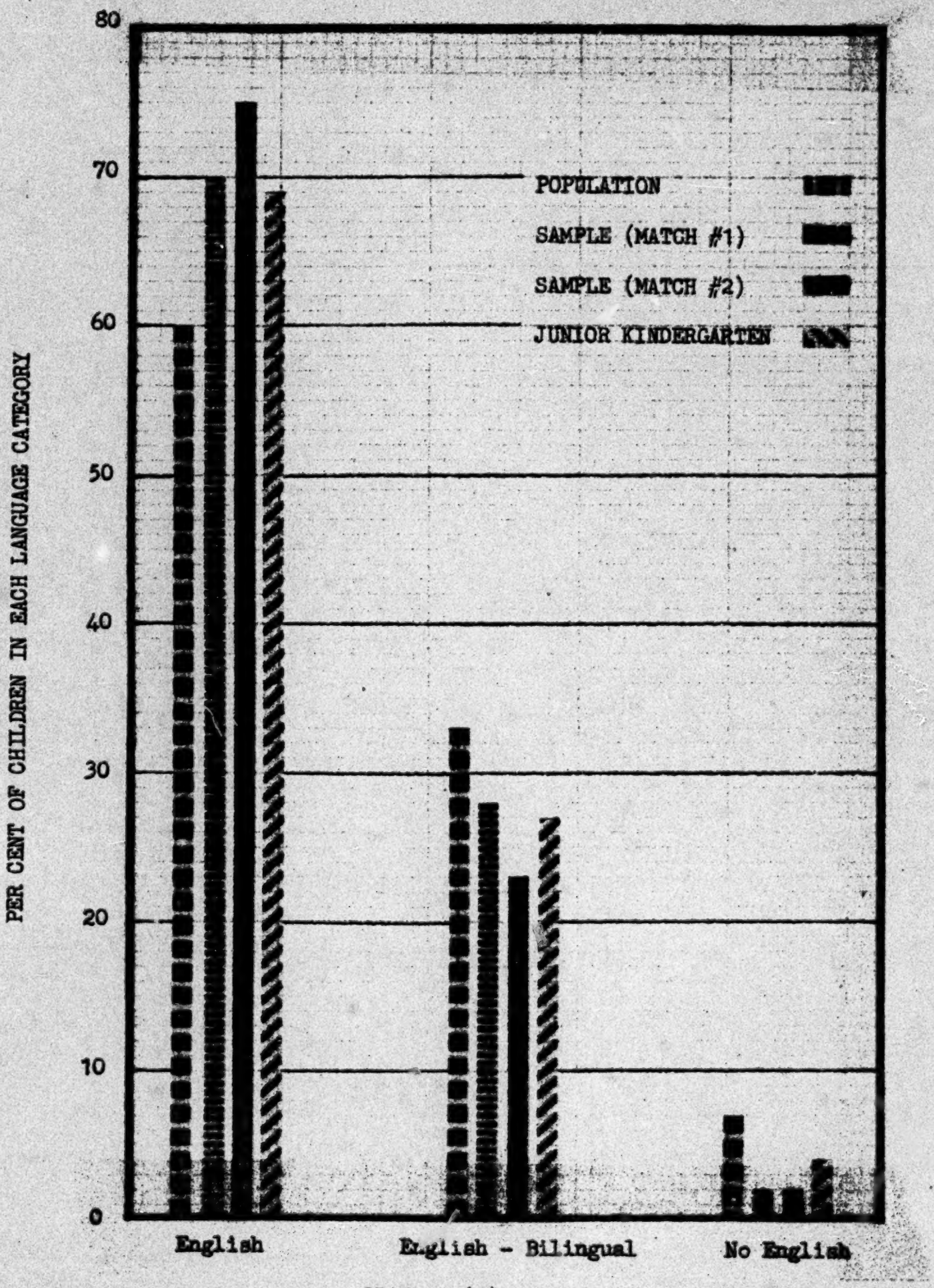
1 - completed public school

2 - did not complete secondary school

3 - completed secondary school

4 - did not complete university

5 - completed university



GRAPH 1 (d)

PER CENT OF CHILDREN FALLING INTO
EACH LANGUAGE CATEGORY

The previous four graphs show that the samples are sufficiently representative of the Toronto kindergarten population to justify generalizations on the basis of the findings. The percentage of children with parents at each educational and occupational level is similar for the four groups illustrated and the trend in language is consistent, i.e., the greatest number of children in each group speak English with English-Bilingual second, and no English third. It is in the context of language however that some discrepancies between the groups appear, e.g., Match #2 has a larger percentage of English speaking children and fewer Bilingual children than Match #1 and total population. Nonetheless, even this difference is relatively small and should not seriously affect the results.

Overall "t's"

The means for junior and senior kindergarten groups were compared for each subsection of the Rating Questionnaire and the Metropolitan Achievement Test. As well, the two groups were compared on the basis of their scores on the Otis Intelligence Quotient Test. These overall comparisons give a general indication as to whether or not the groups differ on the basis of junior or senior kindergarten experience.

Isolated "t's"

In light of the discussion in "Pre-School Education - Pros and Cons" (Palmer, J., 1966) it is worth knowing whether or not all subgroups show similar effects from their school experience. The junior and senior kindergarten groups were compared over each level of parental education and fathers' occupation. Language groups were also included in these comparisons. This method of isolating factors gives an indication as to whether or not junior kindergarten operates differentially within various occupational, educational, and language groupings. This information provides an indication as to the possible practical implications of this study.

III - RESULTS - OVERALL "t's"

Match #1 (Junior kindergarten children compared with those who chose not to attend)

Tables 1 and 2 illustrate the "t's" for various sections of the Rating Questionnaire and the Metropolitan Achievement Test over Stages II, III, IV, and V. The positive effect of junior kindergarten is most strikingly evident in the ratings. The results of the Metropolitan Achievement Test are in the same positive direction but are not consistently significant. (In all of the following tables a positive value of "t" favours junior kindergarten.)

TABLE 1 (a)

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #1 FOR THE RATING QUESTIONNAIRE "OVERALL" SCORES

RATING QUESTIONNAIRE OVER STAGES

Questionnaire Subsections	Stage II (N = 547)	III (N = 523)	IV (N = 469)
Language	3.924**	3.288**	3.046**
Social	2.915**	3.311**	3.487**
Mental	3.589**	3.608**	3.316**
Physical	4.829**	4.191**	2.437*
Emotional	3.621**	2.847**	2.652**
Language and Mental	3.933**	3.691**	3.268**
Total	4.341**	3.897**	3.354**

* Significant at less than .05
** Significant at less than .01

TABLE 1 (b)

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #1 FOR RATING QUESTIONNAIRE "OVERALL" SCORES

RATING QUESTIONNAIRE STAGE V

Questionnaire Subsections	Stage V (N = 510)
Adjustment	2.021*
Performance	2.206*
Creativity	2.468*
Prediction	2.778**
Subtotal	2.457*
Total	2.536*

* Significant at less than .05
** Significant at less than .01

TABLE 2

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #1 FOR METROPOLITAN ACHIEVEMENT TEST "OVERALL" SCORES

METROPOLITAN ACHIEVEMENT TEST OVER STAGES

Subsections of M. A. T.	Stage III (N = 521)	Stage IV (N = 433)	Stage V (N = 393)
Word Knowledge	1.563	1.901	2.491*
Word Discrimination	2.149*	1.591	2.444*
Reading	2.741**	1.551	2.263*
Spelling		1.394	2.085*
Language A			1.556
Language B			1.273
Language A and B			1.473
Arithmetic	2.524*		
Arithmetic A		3.151**	
Arithmetic B		2.439*	
Arithmetic A and B		3.270**	
Arithmetic Comprehension			1.540
Arithmetic Problem Solving			1.967*

* Significant at less than .05
** Significant at less than .01

Match #2 (Junior kindergarten children compared with those who could not attend)

Tables III and IV present the "t's" for the Rating Questionnaire and the Metropolitan Achievement Test. On the whole junior kindergarten is seen as having little positive effect and in some cases it actually appears significantly negative. The ratings, as in Match #1, are generally more positive than the Metropolitan Achievement Test. The implications of this will be discussed in detail later.

TABLE 3 (a)

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #2 FOR RATING QUESTIONNAIRE "OVERALL" SCORES

RATING QUESTIONNAIRE OVER STAGES

Questionnaire Subsections	Stage III (N = 459)	Stage IV (N = 353)
Language	- .686	1.050
Social	.912	2.865**
Mental	- .880	1.717
Physical	.870	1.147
Emotional	- .672	1.578
Language and Mental	- .836	1.358
Total	- .387	1.746

* Significant at less than .05
** Significant at less than .01

TABLE 3 (b)

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #2 FOR RATING QUESTIONNAIRE "OVERALL" SCORES

RATING QUESTIONNAIRE STAGE V

Questionnaire Subsections	Stage V (N = 354)
Adjustment	1.029
Performance	.658
Creativity	1.328
Prediction	.167
Subtotal	1.060
Total	.990

* Significant at less than .05
** Significant at less than .01

TABLE 4

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #2 FOR METROPOLITAN ACHIEVEMENT TEST "OVERALL" SCORES

METROPOLITAN ACHIEVEMENT TEST OVER STAGES

	Stage		
Subsections of M. A. T.	III (N = 430)	IV (N = 360)	V (N = 317)
Word Knowledge	- 3.109**	- 2.408*	- .457
Word Discrimination	- 2.162*	- 2.919**	.030
Reading	- 1.211	- 2.161*	- .127
Spelling		- 2.094	- 1.284
Language A			- 1.454
Language B			- 1.012
Language A and B			- 1.647
Arithmetic	- 1.160		
Arithmetic A		- .350	
Arithmetic B		.747	
Arithmetic A and B		.050	
Arithmetic Comprehension			.618
Arithmetic Problem Solving			.493

* Significant at less than .05
** Significant at less than .01

The Intelligence Quotient scores of junior kindergarten children are higher than their senior kindergarten counterparts. This difference is significant at .01 for Match #1, i.e., this result could occur by chance only once in a hundred times. The difference in Match #2 is positive but not significant.

IV - DISCUSSION - OVERALL "t's"

Statistically junior kindergarten is a great advantage to the children of Match #1. It makes little difference in Match #2 and in some cases the junior kindergarten group is actually surpassed significantly by the senior kindergarten group. The differences between Match #1 and Match #2 become somewhat less mysterious when the senior kindergarten populations in each instance are examined closely. The senior kindergarten group in Match #1 is made up of children whose parents for the most part, chose not to send them to junior kindergarten. As mentioned before, a small percentage of children were refused admission because of a lack of accommodation. In most cases, junior kindergarten was available but the parents decided not to take advantage of the opportunity afforded them. In Match #2 the senior kindergarten population was composed of children in areas where junior kindergarten was not available. It was impossible for them to attend junior kindergarten. In this case the parents' attitudes concerning junior kindergarten were unknown and presumably they exerted a random influence on the children's scores. It would appear that "familial factors" are operational in the senior kindergarten group of Match #1 which affects their adjustment to the school situation and educational achievement as assessed by the Rating Questionnaire and the Metropolitan Achievement Test. In this instance the normal socio-economic indices do not account for the difference because the junior and senior kindergarten children are matched on these factors. The explanation may be akin to the "environmental process variables" studied by Dave (1963) and Wolf (1963). These consisted of such variables as:

1. Achievement press -- how hard is the child pushed by the parents to succeed in school;
2. Language models;
3. Academic guidance;
4. Activeness of the family -- how much external stimulation is there;
5. Intellectuality in the home, e.g., books, intellectual discussion;
6. Work habits in the family.

The lack of significant positive results in Match #2 would seem to indicate that not all children benefit from the experience of junior kindergarten, at least in the areas being reported in this part of the study. The degree of benefit which the child derives might be an "all-or-none" proposition or it might depend on an interactive process involving the home, the school and the child. It would be extremely idealistic to presume that pre-school education itself was a universal, all-powerful antidote for ignorance, lack of motivation and home values which conflict with those of the school. It is much more realistic to assume that given the correct background in which to operate, pre-school education can benefit the child.

In Match #2 the parental attitude of senior kindergarten pupils is not known, but it is assumed to be random. As such it cannot assert any independent power on the results. If the senior kindergarten group in Match #1 possessed a consistent weakness and the senior kindergarten group in Match #2 did not, this difference could account for the different findings.

Intelligence Quotient. The superior Intelligence Quotient of the junior kindergarten pupils in both Match #1 and Match #2 can be interpreted in a number of ways. Perhaps these children have had a stimulating home environment. Because of this, they have developed rapidly and their parents feel they will benefit from junior kindergarten experience. On the other hand, maybe pre-school education is held in greater esteem by more "intelligent" parents who in turn have more "intelligent" children. The alternative to these theories is that junior kindergarten itself exerts a force on the development of "intelligence" as represented by Intelligence Quotient scores. The child who attends junior kindergarten is perhaps more at ease in the school environment, more confident of his ability to please his teacher, and more familiar with the type of material used in Intelligence Quotient Tests because of his earlier start. The nature versus nurture argument has continued for many years without solution. The fact remains, junior kindergarten children obtain higher Intelligence Quotient scores than their senior kindergarten counterparts.

Before continuing with the results and discussion of the isolation factors a few general points must be put forward here. The Toronto Board of Education has operated the junior kindergarten programme since the 1940's. This study looked at children in the regular programme which had lost the gloss of newness. Teachers involved in the study presumably represented the wide variety found in the system as a whole. Following junior kindergarten the children in the study were given no special treatment. They were not streamed separately, nor was any effort made to inform their new teacher of their previous experience. The idea was to incorporate all qualitative aspects of the school environment.

ISOLATION FACTORS

As previously mentioned the computer was used to isolate groups of students by language, parents' education and fathers' occupation. The scores of junior and senior kindergarten children were compared for each of these factors on various levels. To facilitate reading the tables, a symbol was designed to identify each level of each factor. The levels that were studied, and their symbols are presented below.

LANGUAGE:

English

English-Bilingual

EDUCATION: (Mother)

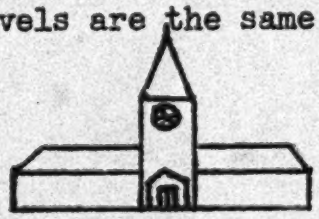
Did not complete public school.

Completed public school.

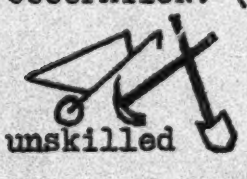
Attended high school.

Finished high school.

EDUCATION: (Father) The levels are the same as for Mother with the addition of:


Graduated from university.

OCCUPATION: (Father)

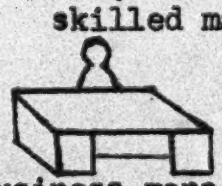

unskilled

semi-skilled

skilled manual

clerical & sales

administrators
small businesses
minor professionals


business managers
owners of medium businesses
lesser professionals

higher executives
professionals

IV - RESULTS - ISOLATED "t's"

Introduction

The "isolation factors" as previously mentioned were language, education of parents, and occupation of father. Generally speaking, no absolutely clear-cut pattern emerged in these results. There seemed to be exceptions to every trend the writer attempted to identify. This was especially true of Match #2. Nevertheless, a picture did emerge from the mass of data. Only <u>total</u> "t" values from the Rating Questionnaire are presented in tabular form in text because these represent the clearest summary data. Results of the Metropolitan Achievement Test and the Otis Quick-Scoring Mental Ability Tests (New Edition -- Alpha Short Form) are reported in running text. (A separately bound appendix of complete tables is available upon request.)

Match #1

Language

Both English and English-Bilingual children seemed to benefit from junior kindergarten experience as shown by the Rating Questionnaire. The "effect" diminished over a period of time, more rapidly in the case of the English-Bilingual children. By grade three the English-Bilingual children with junior kindergarten showed no significant advantage over children without this experience in any of the subsections of the Rating Questionnaire. (See Table 5)

TABLE 5

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #1, ISOLATED FOR LANGUAGE

RATING QUESTIONNAIRE TOTALS OVER STAGES

	Stages							
	II		III		IV		V	
	(N=392)	(N=142)	(N=370)	(N=142)	(N=325)	(N=137)	(N=365)	(N=135)
Total	2.890**	3.822**	3.352**	2.260*	3.154**	1.409	2.275*	1.105

English English-Bilingual

* Significant at .05
** Significant at .01

Metropolitan Achievement Test. The results for the Metropolitan Achievement Test did not show junior kindergarten to be significant in all subsections of the test. With one exception, junior kindergarten did prove to be a positive asset. In Stages III and IV English children seemed to derive more benefit than English-Bilingual children. In Stage V the English-Bilingual children with junior kindergarten showed to better advantage over their senior kindergarten counterparts than in Stages III or IV, but still lagged behind the English children. The notable exception was in Language A (verb tenses). Here the English-Bilingual children with junior kindergarten did much better than their senior kindergarten counterparts, who had not attended junior kindergarten. In this area they seemed to derive much more benefit than the English children from the experience of junior kindergarten.

Intelligence Quotient. Both English and English-Bilingual children with junior kindergarten obtained higher Intelligence Quotient scores than those without this experience. The "t" for the English group was significant at less that .01 level while the "t" for the English-Bilingual group, although positive, was not statistically significant.

Mothers' Education

The children of mothers who did not complete public school seemed to derive little benefit from junior kindergarten. Aside from this group, junior kindergarten was shown to be of positive value. The most striking effect was shown for junior kindergarten children whose mothers had gone to high school, but not graduated.

TABLE 6

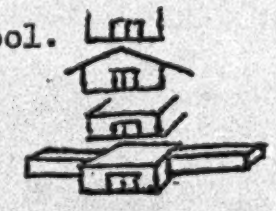
VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #1, ISOLATED FOR MOTHER'S EDUCATION

RATING QUESTIONNAIRE TOTALS OVER STAGES

	Educational Categories			
	Low			High
	0	1	2	3
Stage II	.650	2.398*	2.738**	2.838**
Stage III	-.501	1.659	4.344**	.699
Stage IV	1.312	1.696	2.950**	1.445
Stage V	-.310	.595	2.352*	1.780

* Significant at .05
** Significant at .01

0 - Did not complete public school.
1 - Completed public school.
2 - Attended high school.
3 - Finished high school.



Metropolitan Achievement Test. The Metropolitan Achievement Test could be interpreted in much the same way as the Rating Questionnaire; however, the effect of junior kindergarten appears to increase over time in the case of the mother who attended, but did not graduate, from high school.

Intelligence Quotient. As with the scores on the Rating Questionnaires, and the Metropolitan Achievement Tests, the child whose mother attended high school derived the most benefit from junior kindergarten as reflected in intelligence test scores.

Fathers' Education

Rating Questionnaire. As a whole junior kindergarten proved to be a positive asset. The groups benefiting most were those whose father had completed public school, or had attended, but not completed high school. The effect tended to diminish over time in most cases.

(See Table 7)

TABLE 7

VALUE OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN IN MATCH #1, ISOLATED FOR FATHER'S EDUCATION

RATING QUESTIONNAIRE TOTALS OVER STAGES

	Educational Categories				
	Low 0	1	2	3	5 High
Stage II	1.852	3.269**	2.857**	.390	-.054
Stage III	1.993*	2.326*	3.172**	.203	.129
Stage IV	1.294	1.931	2.699**	1.536	1.335
Stage V	.615	.931	1.788	1.413	1.035

* Significant at .05
** Significant at .01

Code to Educational Categories

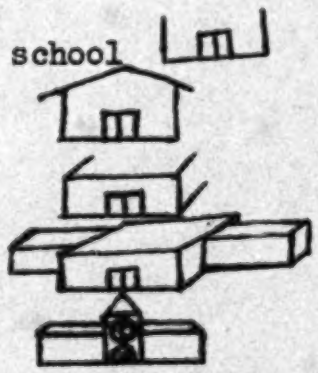
0 - Did not complete public school

1 - Completed public school

2 - Attended high school

3 - Finished high school

5 - Graduated university



Metropolitan Achievement Test. Junior kindergarten seemed to be beneficial to those groups of children whose fathers had some high school, or less, education. The children with fathers from the higher educational groups, high school and university graduates, showed no outstanding effects from junior kindergarten. The children whose fathers attended high school but did not finish, showed the most positive effects from junior kindergarten.

Intelligence Quotient. Junior kindergarten children whose parents completed public school had a statistically significantly higher Intelligence Quotient than their senior kindergarten counterparts. Except for university graduates, the other educational groups showed junior kindergarten to have a positive effect as reflected by Intelligence Quotient scores.

Occupational Groups

Rating Questionnaire. There appears to be a clear break between the upper and lower occupational groups in the benefits derived from junior kindergarten. The junior kindergarten group whose fathers hold clerical or sales, skilled manual, semi-skilled, or unskilled jobs obtained higher ratings than their counterparts without junior kindergarten experience. On the other hand, children of administrators and professionals showed no benefit from junior kindergarten. This breakdown is consistent over the four years of school. All ratings are lower at Stage V or grade three level. This reduction is especially evident for the semi-skilled labour group in which the effect of junior kindergarten almost disappears.

Metropolitan Achievement Test. The break between higher and lower occupational groups exists in the Metropolitan scores as well; however, the children of unskilled labourers and clerical or sales workers show an increase in the positive effect of junior kindergarten in Stage V.

Intelligence Quotient. Junior kindergarten children obtained higher Intelligence Quotient scores than their senior kindergarten partners except in the university graduate category. The only significant positive effect was noted at the skilled manual labour level.

Match #2

Language

Rating Questionnaire. English speaking children with junior kindergarten do better than children without this experience. English-Bilingual children, however, do not show any advantage over their senior kindergarten matched partners. The differences found in Match #2 results are generally smaller than those found in Match #1. In Stage V the English speaking children show a sharp decrease from Stage IV while the English-Bilingual children with junior kindergarten show a slight change from negative to positive.

TABLE 8

VALUES OF "t" REPRESENTING THE DIFFERENCE BETWEEN THE MEANS FOR JUNIOR AND SENIOR KINDERGARTEN GROUPS IN MATCH #2 ISOLATED FOR LANGUAGE

RATING QUESTIONNAIRE TOTALS OVER STAGES

	Stages					
	III		IV		V	
	(N=351)	(N=98)	(N=274)	(N=73)	(N=286)	(N=65)
Totals	.718	-1.966	2.345*	-.397	1.063	.205

English English-Bilingual

* Significant at .05

Metropolitan Achievement Test. Nothing conclusive emerges for the Metropolitan Achievement Test in Match #2 for either of the language groups.

Intelligence Quotient. In both language groups junior kindergarten pupils were favoured, but not significantly.

Mothers' Education

Rating Questionnaire. Very little is shown in the educational groups at any stage. The total "t's" for levels two and three are positive but not significant.

Metropolitan Achievement Test. Children without junior kindergarten experience whose mothers attended high school but did not graduate, show a significant advantage over children who did have this pre-school experience. The effect is reduced in Stage V or grade three. Children with junior kindergarten whose mothers did not complete public school, show a positive effect from this educational experience but it is never large enough to reach statistical significance. The other educational extreme, in this case, children whose mothers completed high school, show little positive effect as a function of junior kindergarten.

Intelligence Quotient. Differences in Intelligence Quotient scores between junior and senior kindergarten pupils are positively significant for children whose mothers entered secondary school. Except for those who did not complete public school all the "t's" are positive.

Fathers' Education

Rating Questionnaire. Children with junior kindergarten experience whose fathers were university graduates obtain significantly higher ratings than their senior kindergarten counterparts. This effect diminishes in Stage V. Children whose fathers attended high school but did not graduate show a positive, but not significant effect as a result of junior kindergarten. In this case as well, the effect diminishes in Stage V. Children of high school graduates also show some positive effects from junior kindergarten experience.

Metropolitan Achievement Test. Junior Kindergarten seemed to benefit the children whose fathers fell in the following categories: university graduates, some high school experience, or some public school experience. The other educational groups do not show any consistent benefit from junior kindergarten.

Intelligence Quotient. The Intelligence Quotient scores for junior kindergarten pupils are higher in all categories except category three (completed high school). In no category however, do the scores reach statistical significance.

Occupational Groups

Rating Questionnaire. The break between the higher and lower occupational categories shown in Match #1 is evident in Match #2 but the positive effect of junior kindergarten is now found in the higher occupational categories. This is particularly apparent in Stages III and V; however, this difference is not always clear-cut, e.g., in Stage IV children of skilled manual workers obtained higher ratings when their school experience included junior kindergarten.

Metropolitan Achievement Test. The higher occupational groups show more benefit than the lower groups but the difference is small.

Intelligence Quotient. Except for the clerical and sales group, children in all other groups have obtained higher Intelligence Quotient scores if they have had junior kindergarten experience. The "t's" however, were not statistically significant.

VII - DISCUSSION - ISOLATED FACTORS

It must be emphasized again that statistics can be misleading. With a large number of comparisons a few statistically significant differences can be expected by chance. In this study it is only when the results seem to be consistent over time or over categories that they indicate the need for careful scrutiny. The matching factors (e.g., age, sex, education, etc.) may not include all the important variables affecting achievement and/or they may be confounded with something else.

The analysis of results in terms of the isolated factors, level by level, was designed to give a clearer, more meaningful picture of the effects of junior kindergarten. What emerged was a profile of the child most likely to obtain higher scores because of his junior kindergarten experience. This child is English speaking with both parents having attended, but not graduated from, high school. His father is likely to be employed at skilled manual labour. The results of Match #2 are not quite as distinct as those of Match #1. Nevertheless, the fact that slight indications of similar trends are present in Match #2 is noteworthy because there are more consistent positive results for these subgroups than for the others.

Going beyond the statistical findings, one can hypothesize as to the reasons for the positive effect of junior kindergarten on children with the background just mentioned. A likely explanation seems to lie in a home-environment factor or factors. Parents whose education was halted in high school might have had just enough schooling to place a high value on it and regard it as essential for their children. A skilled labourer might be sufficiently well off to purchase material goods similar

to those common to the middle class. His middle class aspirations might also be reflected in his desire to educate his children for even greater economic rewards.

It must be remembered that the senior kindergarten counterparts of these successful junior kindergarten children had parents with the same educational experience and occupational status. It would seem that their value-system was different from that of the parents of the junior kindergarten children and served as a self-imposed barrier to mobility. D. F. Swift (1966) cites findings which show marked differences between successful and unsuccessful working class pupils depending on their mobility. "Parents of successful working class boys had a much more middle class set of values than even the middle class." (p. 89) Katz (1964) also noted the extreme variations in values in this stratum of society. This suggested to him that in some cases children of skilled worker families had internalized middle class perceptions and in others, lower class values.

The pressure and interest the child feels from home is going to influence his career at school. (Dave, 1963; Wolf, 1963; Douglas, 1964; Cohen, 1965) The upper lower class child who is encouraged and who incorporates middle class values is likely to be in the same educational situation as the middle class child. "Middle class children are more likely...to embrace the achievement value system which states that given the willingness to work hard, plan and make proper sacrifices, an individual child should be able to manipulate his environment so as to ensure eventual success." (Rosen, 1956, p. 211)

The importance of language is self-evident. The skill of being able to communicate is essential to learning. The quality of that ability to some extent defines the limits of learning. English-Bilingual children

in Match #1 benefited from junior kindergarten too. But, they did not seem to do as well as English children with this experience.

The diminishing influence of junior kindergarten experience over four years need not be surprising. If children can learn at three and four years of age ideas that are valuable to school achievement, then such ideas can be built on steadily. However, all chidren do not and cannot attend junior kindergarten in the Toronto system; junior kindergarten children are placed in the normal programme in senior kindergarten. Initially they show some advantages over their classmates but by the time they reach grade three this advantage seems to have disappeared. If two buildings are being constructed and the foundation for the first is poured before the second, the first is visibly ahead for a certain period of time. If, however, the construction company has contracted to finish both at the same time, then it must pour the second foundation quickly and get on with the job. The first building is likely to be ahead as the ground floor takes shape but by the time the third floor is reached the second building is at the same level. This seems analagous to the situation of the junior kindergarten pupil.

There is however, a different way of viewing junior kindergarten. In some American cities pre-kindergarten programmes are being used to combat the effects of "cultural deprivation." In this case junior kindergarten is seen as a way to acculturate lower class children, to provide them with experiences, attitudes and values similar to those of their middle class classmates. This is a somewhat different and more specialized objective than generally providing advanced education for young children. Construction of a building on marsh land requires that special procedures be undertaken to assure a firm foundation. In this case the initial

procedures are short-term and once they have been carried out the traditional building procedures follow. Junior kindergarten is then viewed as having served its purpose if the "culturally deprived" children are ready to learn the same material, at the same pace as their middle class classmates when both groups enter senior kindergarten.

These two divergent cases point out the importance of identifying the group involved, establishing appropriate objectives, and proceeding in a manner which will accomplish the latter.

The "tests" reported in this study were chosen and designed to provide some evaluation of the child's school achievement. The problems involved in such an assessment of young pupils are considerable. All available standardized tests can rightly be criticized and it was to improve the sources of information that the decision was made to include ratings of pupils by teachers. The "t" values for the Rating Questionnaire are more often significantly in favour of junior kindergarten than the "t" values of the Metropolitan Achievement Test. It is apparent from this that teachers use different criteria for evaluating achievement than those measured by the Metropolitan Achievement Test. Preliminary inter-correlations of the Rating Questionnaire and the Metropolitan Achievement Test (not yet reported) seem to verify this. While scholastic performance is important, other factors are considered by the teacher in evaluating a child's school success. The teacher might also use criteria not directly related to the child's achievement, e.g., personal social status or concept of the teacher's role might influence his/her perception of the child.

Frequency distributions of the ratings seemed to indicate that on a number of variables teachers' perceptions of their own roles affected how they rated the children. One person's perception of a role or of another

person does not detract from the value of a rating but rather extends and enhances the information. It serves to suggest the diversity of elements involved in "achievement." A child's success in school depends not only on his innate intellectual potential and his ability to capitalize on it academically, but also on how he is perceived by his teachers and fellow students. Further studies of the ratings are outside the scope of this report.

VIII - COMMENTS AND IMPLICATIONS

The extensive data and the detailed analyses that have been reported in this study make a complex of information from which there are no simple conclusions. It is not possible to draw the implication that junior kindergarten is either useful or useless, because junior kindergarten does not affect all children in the same manner. It appears that in terms of school achievement, junior kindergarten does benefit some children more than others. Those English speaking children with mothers and fathers who attended high school but did not graduate and whose fathers held skilled labour jobs, derived the most significant benefits from junior kindergarten experience. The matching technique showed however, that these findings were not independent of some unknown familial factor(s). The differences between the groups with and without junior kindergarten experience were considerably smaller in Match #2 than in Match #1. This seems to indicate that some bias, not controlled by the matching, differentiates the group of parents who did not send their children to junior kindergarten when it was available from those who did.

The fact that junior kindergarten does not have similar effects for other groups could be because of either ineffective programming and/or some characteristic of the home environment. In the case of the "lower class" child it could be a combination of the two. It is important for the teacher to identify and evaluate by some means the background and experience of each pupil and then determine the most appropriate approach to teaching. This task is difficult because the most appropriate approach for a given pupil is not always known. The difficulties are compounded because the school districts of Toronto are not homogeneous. Junior

kindergarten classes established in areas to serve the "culturally deprived" were attended by large numbers of English speaking, middle class youngsters (Toronto Board of Education, 1965).

An important step has been made this year with the publication of the kindergarten booklet in Italian, Greek, and Portuguese. Beyond informing the public of the facilities available, there is little the Board can do at present to change the other vital factor in education, home environment.

The Board of Education can institute special programmes. These programmes can and should recognize the influence of the home, but the attitudes of the home cannot be legislated. Given an early start, programmes can be established which will enable the child to avoid repeated failure because of values which conflict with those of the school system.

The pupils who belong to the middle class and above, are probably, for the most part, adequately prepared for the senior kindergarten programme (Rosen, 1956; Rice et al., 1965; Deutsch, M., 1960). This seems to be confirmed by the results of this study in that statistically significant differences are relatively few, and small, between these groups of pupils with and without junior kindergarten experience. The fact that they are "adequately" prepared does not seem ample justification for excluding them from the pre-school programme as is currently being recommended in some cities in the United States (Rice et al., 1965). It is possible an enriched junior kindergarten programme could benefit middle and upper class children. Ignoring these children would represent a new form of social class bias.

If public education is to be extended to all children of four years of age the entire public school programme should take this into account. As it now stands, the effects of junior kindergarten seem to disappear in about four years.

* * *

"No research is ever quite complete. It is the glory of a good bit of work that it opens the way for something still better, and this repeatedly leads to its own eclipse."

...Mervin Gordon

This study has implications for future research and for educational policy. The results that have been reported suggest topics for further investigation involving both further data analysis and further data collection.

a) A careful analysis of teachers' ratings would provide information about teacher-child interaction. What pupil characteristics are most important to the teacher? What part do the pupil's social class and values play in teachers' evaluations of their pupils? Extended studies of ratings by teachers would be helpful in exploring the less tangible issues affecting learning in the school setting.

b) What familial factors are most important in education? What is the character of their action on the educational process? The results from this study showed that the senior kindergarten group in Match #1 made consistently lower scores than the junior kindergarten group.

Match #2 results did not show this to be the case. Since the groups were equated on the basis of socio-economic indices, the variable of concern was hypothesized to be a familial one.

c) How do children react to their parents' values? How do they resolve conflicts between home and school values? A child's success in school depends on more than an able teacher and an active mind.

This is the first report that deals with the school success of the pupils in the longitudinal Study of Achievement. Considerable data has been compressed to provide a meaningful picture of some of the ways in which junior kindergarten affects school achievement. There are several important implications of this study. First, we cannot expect to find uniform effects from a programme such as junior kindergarten across different socio-economic groups. Second, it seems necessary that the primary school programme build on the child's junior kindergarten experience if the latter is to have a lasting effect. Third, factors in the home (possibly attitude of parents to education, home values in general) have a definite effect on the success of a child in school. Conflicts between home and school values need to be appreciated and resolved.

The complexity of the interrelationships of the child and his home and school environments is only beginning to be uncovered. Further knowledge and understanding in this area of study should provide solutions to a number of current problems in education.

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